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THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF WATFORD

COUNTY OF LAMBTON

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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

VILLAGE OF WATFORD

COUNTY OF LAMBTON

AUGUST 1968

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION

A water pollution survey of the Village of Watford was conducted by Commission staff during August 1968.

Mr. L. Barnes, Clerk-Treasurer, provided information pertinent to the survey.

GENERAL

The Village of Watford with an assessed population of 1,248 (1968 Municipal Directory) is located on Highway #79 in the east central portion of the County of Lambton. The municipality is approximately 400 acres in size.

In general, the municipal surface water drainage system discharges mainly to the west into unnamed tributaries of Bear Creek. Some drainage is also directed easterly towards Brown Creek which in turn flows southerly to the Sydenham River.

The water pollution survey, as conducted, consisted of locating and sampling municipal surface water drains and storm sewers, which contained significant flows, to determine the level of pollution being discharged into the watercourses from the village area.

The appendixes to this report include the laboratory analyses results, a map showing the location of the sampling points as well as an interpretation of the analyses.

WATER SUPPLY

The potable water supply for the Village of Watford is obtained from the Petrolia water system via an 8 inch diameter pipeline. In 1967, an average daily water consumption of 0.152 mgd was recorded for Watford.

WASTE DISPOSAL

Municipal

Septic tank systems are utilized on most properties for the treatment of residential and commercial sanitary sewage and domestic wastes. The predominantly clay soil conditions, tend to result in unsatisfactory operation of field tile disposal beds in many instances.

The Village of Watford has requested the OWRC to construct a provincially-owned sewage works. This project is in the intermediate stages of development.

Refuse Disposal

The municipal refuse disposal site is located approximately one mile north of Watford in Lot 19, Concession 4, Township of Warwick. There was no indication of surface water run-off or drainage to local watercourses from the disposal site at the time of the survey.

WATER POLLUTION

Surface Water Drainage

A total of ten municipal surface water drains or storm sewers were examined for water quality. Of this total, nine drains flowed west from the village with one drain (sample number SYBR 74.3 W) flowing east to Brown Creek.

A perusal of these results indicate that all ten sampling points had high concentrations of biochemical oxygen demand or suspended solids. Coliform organism counts above OWRC objectives of 2,400 coliforms per 100 ml of sample were also found in these results.

Watercourse Quality

Sanitary chemical results of samples collected from Brown Creek showed an increase of BOD and coliform organisms per 100 ml as the creek flowed near the village.

SUMMARY

Based on the observations and findings of this survey, it is evident that sanitary sewage is gaining access to municipal surface water drains.

Since this contamination is extensive and since soil conditions in many parts of the Village of Watford are such that septic tank field tile disposal systems do not operate effectively, the pollution problem can best be solved on a municipal level in the form of a communal sewage collection and treatment works.

RECOMMENDATIONS

The provincially-owned works being developed for the Village of Watford should be installed at the earliest possible date.

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Prepared by

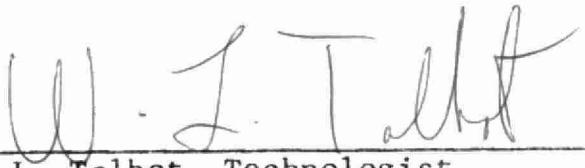

W. L. Talbot, Technologist,
Division of Sanitary Engineering.

TABLE I
VILLAGE OF WATFORD - WATER POLLUTION SURVEY
SURFACE WATER DRAINS AND STORM SEWERS

<u>Location of Sampling Points</u>	<u>Description of Sampling Points</u>	<u>5-Day BOD (ppm)</u>	<u>SOLIDS (ppm)</u>			<u>Anionic Detergent as ABS (ppm)</u>	<u>Coliforms per 100 ml (M.F.)</u>	<u>Flow (GPM) *</u>
			<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>			
SYNEN - 60.125 D	Open Drain between Victoria St. and North St. at John St.	15	634	32	602	0.2	136,000	2-4
SYNEN - 60.12 W	Brown-Jarriott 8" Ø outfall at John St.	32	746	176	570	Sample Exhausted	3,000,000	2-3
SYNEN - 60.0A W	Simcoe St. 12" Ø outfall west of John St. - No.A	20	598	34	564	Sample Exhausted	12,000,000	4-6
SYNEN - 60.0B W	Simcoe St. 18" Ø outfall west of John St. No.B	36	594	43	551	Sample Exhausted	28,000,000	4-6
SYNE - 59.98 W	Erie St. Outfall West of John St.	63	1564	509	1055	Sample Exhausted	3,000,000	4-6
SYNE - 60.3 W	Huron St. Outfall	13	658	18	640	0.3	1,000,000	-
SYNE - 60.31 "	Open drain plus Front St. Drain	7.0	704	139	565	0.1	5,000	-
SYNEN - 59.5 D	Open drain west of John St. at North St.	4.0	540	40	500	0.1	9,000	-
SYNE - 60.4 W	Front St. Drain	10.0	628	17	611	0.2	310,000	-
SYBR - 74.3 W	10" Ø outfall to Brown Creek near C.N.R. tracks	2.2	370	28	342	0.5	9,000	-

* Flows as stated are estimated.

TABLE II
VILLAGE OF WATFORD - WATER POLLUTION SURVEY
WATERCOURSE QUALITY

<u>Location of Sampling Points</u>	<u>Description of Sampling Points</u>	<u>5-Day BOD (ppm)</u>	<u>SOLIDS (ppm)</u>			<u>Anionic Detergent as ABS (ppm)</u>	<u>Coliforms per 100 M.L. (M.F.)</u>
			<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>		
SYNE - 59.7	Unnamed Creek at Con. 4-5 Road Warwick Township	13	532	26	506	0.2	106,000
SYBR - 75.5	Brown Creek at Con. 4-5 Road Warwick Township	4.4	384	95	289	0.1	16,000
SYBR - 72.8	Brown Creek at Con. 5-6 Road Warwick Township	7.6	494	28	466	0.1	40,000

APPENDIX

SIGNIFICANCE OF LABORATORY ANALYSES

BACTERIOLOGICAL EXAMINATION

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objective for surface water quality in Ontario is maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms.

SANITARY CHEMICAL ANALYSES

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million (ppm) is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses with regard to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and the results are reported in "Turbidity units".

PHYSICAL DETERMINATIONS

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen in water is replaced by oxygen from the atmosphere. There is a saturation value for each temperature. At 18° C this is 9.54 ppm of dissolved oxygen. Values below the saturation level indicate the presence of polluting organic substances which are absorbing oxygen from the water. The extent of this deficiency is one index of the degree of organic pollution. Substantial reduction in dissolved oxygen causes suffocation of fish.

Temperature

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

Anionic Detergent (ABS)

The presence of anionic detergent generally indicates pollution from domestic sources.

Abbreviations and Symbols

Engineering Terms

ABS - Alkyl Benzene Sulfonate
BOD - Biochemical oxygen demand
gpd - Gallons per day
mgd - Million gallons per day
ppm - Parts per million
ppb - Parts per billion
ml - millilitre
MF - Membrane Filter

Miscellaneous

Diss. - Dissolved
No. - Number
Susp. - Suspended

APPENDIX

COMMUNITY PLANNING

The need for effective planning has become more important today than ever before. Municipalities are being burdened with the rising costs of land and labour. Therefore, any project a community hopes to develop should be based on sound planning. Planning at all levels of government is essential but, community planning can be most effective if interest and initiative is generated at the local level. The enormous benefits accrued as a result of good planning can more than compensate for the initial investment.

Community planning can be described as an effort to control and direct development effectively. This can best be achieved through the development of an official plan. An official plan is the stated intention of the local authorities with respect to orderly development within the planning area, that is prepared and set forth with professional assistance and meets the requirements as set out by the Provincial Planning Act. An official plan can be a joint effort by a number of municipalities which have common basic characteristics and common problems, or one municipality can establish a plan on its own initiative.

Orderly development yields future economy in services. Development in the community can be retarded where an official plan does not exist. A plan provides, among other things, the framework

for the rational design of water and sewage works and also the extensions of mains and collector sewer systems.

A local council having decided to proceed with a programme of community planning definitely should contact the Ontario Department of Municipal Affairs. Through its many branches, information and guidance is provided to all interested parties.